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A PERSON-CENTRED APPROACH TO THE JOB DEMANDS-CONTROL MODEL: TESTING STRAIN AND LEARNING HYPOTHESES THROUGH LPA

Mafalda Martins de Campos Gameiro

MESTRADO INTEGRADO EM PSICOLOGIA

(Secção de Psicologia dos Recursos Humanos, do Trabalho e das Organizações)

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Dissertação orientada pela Professora Doutora Maria José Chambel

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Abstract

We used a cross-sectional design and a person-centred approach in order to test the strain and learning hypothesis of Karasek's Job Demands-Control Model among a sample of Portuguese nurses, bankers, retail traders and contact centre employees (n = 5641). Through Latent Profile Analysis (LPA), we first identified latent profiles of demands and control and then examined how these groups differed in well-being (engagement, exhaustion and cynicism levels) and motivation- related outcomes (engagement), through an ANCOVA. LPA revealed five profiles: "High-strain", "Moderate-strain", "Moderate Active", "Moderate" and "Active". The strain hypothesis was supported in both direct effects and interactive effects (buffer hypothesis), suggesting that the difficulty in finding consistent support for the buffer hypothesis might be related to the use of variable-centred approaches. Moreover, this shows that, in organizational practice, if control is provided there is no necessary need in reducing demands at work, as control will buffer demands' harmful effects on well-being. Learning hypothesis could not be tested due to the fact that a Passive profile was not found in this sample. However the comparisons between the "Active" and the "Moderate" profiles suggests that motivation is higher in the presence of both high job demands and control. This leads us to believe that when people are presented with considerable demands and have control over they jobs, they will be more motivated to grow professionally and consequently obtain better outcomes.

Keywords: Demands-control model; engagement; exhaustion; latent profile analysis; strain hypothesis; buffer hypothesis; learning hypothesis; person-centred approach.

Resumo

Utilizou-se um desenho experimental transversal e uma abordagem centrada na pessoa por forma a testar a hipóteses de strain e a hipótese de aprendizagem propostas no Modelo de Exigências e Controlo (Job Demands-Control Model) de Karasek. Para tal, usou-se uma metodologia de análise de perfis latentes numa amostra de enfermeiros, bancários, comerciais de retalho e empregados de contact centre portugueses (n = 5641), para identificar os perfis latentes de exigências e controlo. Dessa análise surgiram cinco perfis: "High-strain", "Moderate-strain", "Moderate Active", "Moderate" e "Active". A seguir, através de uma ANCOVA examinou-se como é que estes grupos diferiam em termos de bem-estar (i.e. engagement, exaustão e cinismo) e motivação (i.e. engagement). A hipótese de strain foi corroborada, tanto em termos de efeitos diretos como interativos (hipótese de buffer), sugerindo que a anterior dificuldade em encontrar resultados neste sentido, poderá dever-se ao uso de abordagens centradas nas variáveis. Mais ainda, em termos práticos, estes resultados reforçam que quando existe controlo suficiente no trabalho não é impreterível que se reduzam as exigências uma vez que o controlo sentido irá atenuar os efeitos negativos das mesmas no bem-estar do indivíduo. A hipótese de aprendizagem não pode ser testada uma vez que não surgiu um perfil passivo como se tinha proposto inicialmente. Contudo, as comparações entre os perfis "Active" e "Moderate" sugerem que há maiores níveis de motivação na presença conjunta de altas exigências e alto controlo. Isto leva-nos a crer que trabalhadores com elevadas exigências mas também com alto níveis de controlo sobre o seu trabalho, estarão mais motivados a crescer profissionalmente e, a obter melhores resultados.

Palavras-chave: modelo das exigências e controlo; engagement; exaustão; cinismo; análise de perfis latente; hipótese de *strain*; hipótese de *buffer*; hipótese de aprendizagem; abordagem centrada na pessoa.

Worker's well-being and stress are two very concerning topics either for organizational practitioners as well as investigators all around the globe. The Occupational Health Psychology field emerged in the 90's (Raymond, Wood, & Patrick, 1990) and is incrementally growing through times in order to analyse those topics. Its main focus on stress and well-being is by understanding workers' underlying psychological processes and concerns "the application of psychology in order to improve the quality of work life and to protect and promote the safety, health and well-being of workers" (definition of the US National Institute of Occupational Safety and Health - NIOSH) (Schaufeli, 2004, p. 503).

A significant amount of research in this area shows that worker's well-being and stress have a direct impact in many work outcomes such as productivity, involvement and absenteeism, satisfaction, motivation, turnover and performance (Luchman & González-Morales, 2013; Wright & Cropanzano, 2004; Wright, Cropanzano, & Bonett, 2007). Thus, it becomes of the most relevance to understand these concepts at their fullness, in order to develop new sharp theoretical knowledge and interventions that seek to improve workers and their respective companies' job experiences and results. Furthermore, this paper comes in direct line with the proposed agenda of NIOSH for research and development which encompass "research on the prevalence of work organization risk factors such as high job demands, low job control, (…)" (Schaufeli, 2004, p. 503).

According to the well-known Karasek's JDC Model (1979), job demands and job control are two key job characteristics that are strongly predictive of well-being levels. This model has two central hypothesis: the strain hypothesis and the learning hypothesis. The first one refers to how job demands and control influence directly or interactively well-being and the second one focuses on how these two factors affect learning. These assumptions have already been tested several times and the support found was evident for the direct strain

hypothesis but not so much for the interactive strain hypothesis (known as buffer hypothesis) (Fila, 2016; Häusser, Mojzisch, Niesel, & Schulz-Hardt, 2010). Moreover there aren't still enough studies to draw strong conclusions about the learning hypothesis (Taris & Kompier, 2004).

Mauno, Mäkikangas and Kinnunen (2016) pointed that one possible explanation for the lack of support found for the buffering hypothesis was methodological due to the use of variable-centred approaches in the majority of studies. Person-centred approaches are known to be better for testing interactive frameworks as they allow to study multiple observed measures together, as a whole (Lubke & Muthén, B. O., 2005) and assume that the association between those variables can be explained by the existence of latent profiles (Laursen & Hoff, 2006).

Thus, our main objectives are to check if (1) the profiles emerge consistently with previous literature, (2) if the direct strain hypothesis is supported and (3) if there are new findings about the buffer hypothesis and (4) the learning hypothesis, using LPA. Our study also adds on previous studies, a sample with a very large number of employees (over 5000) from different activity sectors and occupations (health, bank, retail and contact centre), while, for example, Mauno et al. (2016) had only about 1000 employees all working on the education sector, from two Universities.

Understanding these relationships between work characteristics (job demands and control) and well-being (specifically, engagement, exhaustion and cynicism) will allow to design multidisciplinary interventions that help employers to improve their personnel's well-being, motivation and consequently enhance their positive work outcomes and reduce the presence of the existent negative ones. Moreover, if interesting results are found, this study contributes for the few existent literature that draws on person-centred approaches regarding this topics and also calls on the employment of this methodological approach.

Theoretical Framework

Lazarus and Folkman (1984) introduced the cognitive appraisal perspective which states that an emotional response is triggered depending on how someone evaluates the implications, meaning or significance of some aspect of their environment. Individuals may evaluate a situation by the impact it has on their personal well-being (primary appraisal) and by the possibility of doing something to cope with the potential benefits or threats (secondary appraisal).

In line with this, job characteristics can be seen as stressors as they depend on the way people perceive them. Consequently, different cognitive evaluations regarding this characteristics may influence the way job control and job demands are noticed at work. The perceptions of these characteristics strongly influence the well-being felt by employees (Karasek & Theorell, 1990).

Among many other models that were conceptualized, used as theoretical foundation and empirically tested regarding this theme, the Job Demands-Control (JDC) Model (Karasek, 1979; Karasek & Theorell, 1990) is considered one of the most well-studied and prestigious model used to research and intervene on the areas previously mentioned (Griffin & Clarke, 2011; Kain & Jex, 2010). Particularly, the JDC was and still is crucial for understanding the relationships between work characteristics and their impact in employee well-being, health, performance and learning motivation.

The model showed, in several meta-analyses and reviews, an undeniable predictive validity in respect to numerous stress-related outcomes (De Lange, Taris, Kompier, Houtman, & Bongers, 2003; Gilbert-Ouimet, Trudel, Brisson, Milot, & Vezina, 2014; Häusser et al., 2010; Luchman & González-Morales, 2013; Van der Doef & Maes, 1998, 1999). However, the majority of these studies used a variable-centred approach which could have some limitations when studying possible interaction effects (Bergman & Wangby, 2014).

Considering that, it is possible that the lack of support found for the interaction proposed by Karasek (explained ahead) was also methodological. Moreover, to better understand how demands and control interact in the same individual, it is important to consider that interaction through profiles, namely using a person- centred approach.

In person-centred approaches, the focus stands on identifying latent subpopulations of individuals relevant to the problems under study, based on multiple significantly different observed measures (Lubke & Muthén, B. O., 2005; Muthén, B. O., & Muthén, L. K., 2000) and studying them together as a whole. This perspective sees individuals in a more holistic view (Meyer, Morin, & Vandenberghe, 2015), through some type of pattern-oriented approach (Bergman & Trost, 2006) instead of emphasizing the separate variables (Bergman & Wangby, 2014). Due to this reason we chose to use Latent Profile Analysis to retest Karasek's hypothesis. Latent Profile Analysis (LPA) focuses on sorting individuals into groups of individuals who are similar to each other and different to people in other groups (Bauer & Curran, 2004) based on their patterns of observed characteristics (Bergman & Magnusson, 1997). LPA also assumes that the association between variables can be explained by the existence of latent profiles (Laursen & Hoff, 2006).

The advantages of this technique are the possibility of evaluating more rigorous criteria to determine the preferential number of profiles (Meyer, Stanley, & Vanderberg., 2013), the possibility to readily compare different models (Bauer & Curran, 2004) and the fact that its profiles are empirically-derived (Lubke & Muthén, B. O., 2005) instead of chosen through cut-off scores.

As so, adopting a person-centred approach, through LPA, helps us consider the combination of attributes (in this case, job demands and job control) that might usefully describe the person (Thomas & McGarty, 2018).

According to the JDC model, there are two key job characteristics that help define the

psychological work environment: job demands and job control (Karasek, 1979; Karasek & Theorell, 1990). Although job demands started to comprise some more aspects over time, such as role conflicts, physical and emotional demands (Karasek et al., 1998), as well as task requirements (Karasek & Theorell, 1990), the most traditional and straightforward operationalization was made in terms of the quantitative aspects: workload and time pressure (Karasek, 1979). In line with Hobfoll (2001), job demands can also be grasped as a perceived lack or potential loss of personal resources to cope or deal with the work environment. For example, when talking about workload demands this resource perspective proposes that those demands are stressful as an individual perceives that they have insufficient time or personal skills to complete the tasks demanded.

The other job characteristic mentioned previously is job control. This is usually operationalized as work autonomy and decision authority (Ganster & Fusilier, 1989; Spector, 1986) as it refers to the potential control over tasks, for example, timing and method control (Häusser et al., 2010) as well as conduct during the work day (Karasek, 1979). Rothbaum, Weisz and Snyder (1982), added the concept of "primary control" and they defend that those two aspects are the ones that allow the person to intervene directly in order to change their environment. In compliance with Hobfoll's (2001) theory, Bakker and Demerouti, (2007) theorized job control as a job resource or an aspect of the working environment that allows an employee to deal with workplace demands.

As so, Karasek posted that the combination of different levels (high or low) of these two work characteristics (job control and job demands) results in four groups of perceived work environments: Low-strain, High-strain, Passive and Active. The first group, (Low-strain), is characterized by the combination of not very demanding tasks and a very good control latitude and freedom of decision about their schedule. On the contrary, the High-strain group refers to very demanding and complex jobs with very little control. Passive jobs

are undemanding jobs with little or no decision latitude (e.g. repetitive jobs). On the other hand, Active jobs are highly demanding and also allow the employee to decide when and how they do their work.

Although the jobs used as samples in this paper typically are described as jobs with medium to high levels of demands, it is possible to expect the emersion of a "low-strain" group as well as a "passive work" group as there are differences between the ways people interpret and perceive their environment (Lazarus & Folkman, 1984).

Thus, we established:

H1: According to Karasek's Model (1979), we can expect five different profiles of Job Demands and Control to emerge: (1) a "high-strain profile" where people score high on demands and low on control; (2) a "low-strain profile" with low or moderate demands and high control scores; (3) an "active work profile" in which employees score both high in demands and control; (4) a "passive work profile" with low demands and control; and (5) a "moderate profile" with moderate levels of both demands and control.

The JDC Model is known for its central hypothesis that concerns the relationship between the demands and control levels and the positive or negative states experienced at work.

Burnout is considered the negative state and is characterized by emotional exhaustion (i.e., the draining of emotional resources), cynicism (i.e., a negative, callous, and cynical attitude towards one's job) and lack of professional efficacy (i.e., the tendency to evaluate one's work negatively) (Maslach, 2003). On the other hand, engagement is considered the positive state of energy and connection experienced at work in relation to mental well-being and health. Due to its persistent and extensive affective-cognitive state, that is not focused on any particular thing (e.g. an object, event, person), it can also be considered as a mood, more than a simple momentary, specific emotional state. Work engagement is defined as "a

positive, fulfilling and work-related state of mind that is characterized by vigour, dedication and absorption" (Schaufeli, Salanova, González-Romá, & Bakker, 2002a, p. 74). Vigour involves high levels of energy and mental resistance, persistence when faced with difficulties and desire to invest effort in work. Dedication refers to being heavily involved at work and experience feelings of significance, enthusiasm, pride, inspiration and challenge towards the work. Absorption is characterized by being totally concentrated and happily engrossed in one's work and it provokes the perception that time flies when you are working (Schaufeli & Salanova, 2007). Practically speaking, work engagement has become a relevant topic for organizations and their management due to its links with performance and other positive indicators such as extra role behaviour and affective commitment (Bakker, Schaufeli, Leiter, & Taris, 2008).

Considering this, the central principle of the JDC Model is that demanding jobs that afford little control over work are most likely to lead to decrements in well-being and to induce stress (Fila, 2016). Karasek (1979) started this line of thought proposing the strain hypothesis. This hypothesis states that the most negative psychological well-being and strain levels are found in employees working in high demands and/or low control environments ("high-strain" jobs).

Moreover, the reduced well-being felt by people in "high strain jobs", as predicted by the strain hypothesis, has been studied as being the result of either just additive effects or also being the result of multiplicative (interactive) effects (Van Vegchel, De Jonge, & Landsbergis, 2005). The additive effects of the JDC, specifically the negative association of job demands with well- being and the positive association of job control with well-being, have received considerable support (Belkic, Landsbergis, Schnall, & Baker, 2004; De Lange et al., 2003). For instance, Van der Doef and Maes (1999) found support in 58% of the reviewed studies and Häusser et al. (2010) found support in 60% of theirs.

Even though it was concluded that the evidence on the additive effects is already strong enough (Häusser et al., 2010), as we are trying a different methodological approach, we propose that:

H2: The "high-strain profile" will be associated with worse levels of well-being (low engagement and high exhaustion and cynicism) than the other profiles.

In contrast, the buffer hypothesis refers exclusively to an interactive effect of both demands and control in well-being. A buffering effect is a process where a psychological resource reduces the impact of job stress on psychological well-being. In this case, in line with Hobfoll's theory (2001), job control is seen as a resource that contributes to adjustment and is predicted to attenuate the negative impact of demands on well-being (Karasek, 1979; Karasek & Theorell, 1990; Van der Doef & Maes, 1999). In other words, control acts as a moderator on the negative relationship between job demands and well-being since autonomous employees actually intervene and actively change their work processes (Spector, 2002; Warr, 1987). By having control over their work, employees conduct their work tasks, restructure their pacing and timing and choose from different methods to accomplish their working goals (Jackson, Wall, Martin, & Davids, 1993), reducing the perception of insufficient or potential loss of personal resources. According to Fila (2016), not only this interactive proposition is intuitively attractive, it is also consistent with a broad assortment of other general theoretical and primary research on the importance of control in reducing stressors' effects.

However, Karasek himself, who proposed and examined this interaction effect in 1979, stated later, in 1989, that the existence of this effect was not the primary issue of his model. Moreover, Carayon (1993) and Jones and Fletcher (1996) found it difficult to demonstrate empirical support for this interaction in burnout prediction. Furthermore, overall empirical support for the interactive/buffering effects of the JDC model is a lot less consistent

than the support for the additive effects of the strain hypothesis. For instance, Van der Doef and Maes (1999) found that interaction effects were supported only in 48% of studies, often just partially. In Taris' (2006) words, they found that this interaction depended on participants' scores on third variables (e.g. personality traits) or on the type of analysis conducted (e.g. ANOVA versus regression analysis).

The most recent review by Häusser et al. (2010) found that the corresponding proportion was just 39% and pointed the samples and the measure-based differences as the possible reasons for this lack of support.

Mauno et al. (2016) also argued that one reason may be methodological once the majority of approaches taken were variable-centred by computing an interaction term (demands x control). Considering this raised limitation, and as said before, we chose to use LPA, in order to retest this possible interaction using a person-centred approach.

Positive findings concerning this interaction are relevant due to the fact that, if found, they will support the need to raise employees' job control, without having to reduce demands, in order to improve well-being. As De Jonge, Dollard, Dormann, Le Blanc and Houtman (2000) pointed out, this would be a significant finding once there is a persistent difficulty in reducing demands if organizations want to progress on the competitive global market. On the contrary, if only the additive strain hypothesis keeps being supported, this strategy would not be effective once job demands would maintain their damaging effect on employees' well-being.

For the previously stated reasons, we aim to re-analyse, using a Latent Profile Analysis, whether or not control buffers the negative consequences of demands (exhaustion and cynicism) and maintains the presence of positive work well-being (engagement). So we propose that:

H3: The "active profile" will be associated with better levels of well-being (high

engagement and low exhaustion and cynicism) than the "high-strain profile".

Demands are commonly seen as negative and harmful. However, this point of view was already averted by Karasek who proposed that demands and strain can have positive implications acting as challenges.

Thus, the second hypothesis, proposed by Karasek (1979) and improved by Karasek and Theorell (1990) and Theorell and Karasek (1996), states that job demands and job control also affect employees' motivation and willingness to learn. This was called the learning hypothesis and states that high (but not overwhelming) demands in combination with high control leads to increased learning, motivation and development of skills.

Therefore, according to the JDC Model, these so called "active jobs" require both individual and psychological energy expenditure (demands or challenges) and the exercise of decision-making capability, which are understood to be the soil for professional skills to grow on (Theorell & Karasek, 1996). In other words, when individuals, who are able to decide how to behave and conduct their jobs, successfully cope with a new challenge or demand, they incorporate that response into their repertoire of coping strategies. This way, they learn new ways to tackle adversities and expand their range of solutions, becoming more effective and feeling more motivated. This concept of learning can be seen as the acquisition of new skills and behaviour patterns, effective problem solving and work involvement and motivation (Taris & Kompier, 2004). Due to these outcomes, the model also predicts an increase in productivity which is a major concern in organizational context.

On the other hand, "passive jobs" are seen as demotivating and potentially harmful for professional development. As there are no challenges that require the development of new strategies, these kind of environments might lead to "negative learning" or gradual loss of previously acquired skills.

Until 1996, according to de Jonge and Kompier (1997), there were only three

published studies that provided evidence for Karasek's learning hypothesis of the JDC Model. Later, in 2004, Taris and Kompier found 18 studies from which two thirds confirmed the predictive effect of demands and control on learning indicators. However, they argued that it was still too early to draw any definite conclusions due to the fact that none of the studies used objective measures of learning and also because most of those studies relied on self-reported measures.

There were some more recent studies that focused on overcoming the problem of operationalizing learning measures which found support for this hypothesis. For example, active learning was operationalised in terms of learning new job-related skills (De Witte, Verhofstadt, & Omey 2007), individual innovation and creativity at work (Martín, Salanova, & Peiró, 2007), problem oriented skills (Daniels, Bookcock, Glover, Hartley, & Holland, 2009), general problem- solving strategies (Bergman et al. 2012), stimulation to acquire new knowledge and skills and quantitative performance and accuracy (Häusser et al., 2010).

However, theoretical and empirical support is still needed to corroborate this hypothesis especially regarding person-centred approaches. Therefore, we aim to investigate how activation profiles differ in terms of learning. Following the previously mentioned Taris & Kompier (2004) approach, we will use a motivational variable to test for will to learn. Engagement, as it compounds vigour, as in the energy, desire and capacity to invest effort, (Schaufeli, Bakker, & Salanova, 2006), will be used for this purpose. Also, according to Karasek et al. (1998) this mental energy is crucial for work-related learning and development. Moreover, Deci and Ryan (2012) added that one of the core components of human motivation is a sufficient level of mental energy or vitality which ensures that certain targeted behaviours occur. Thus, we propose that:

H4: The active profile will have better engagement levels than the passive profile.

Method

Participants and Procedure

The sample used in this study consisted of 5641 Portuguese employees from four different occupations: nurses (*n* = 861), bankers (*n* = 1769), retail traders (*n* = 922), and contact centre agents (*n* = 2089). Approximately, 60.5 percent of the sample were women (*n* = 3413). The majority of the sample were between 18 and 28 years old (*n* = 2044; 36.9%), and 29 and 38 years old (*n* = 1281; 22.7%). The biggest part of the sample had between 1 to 5 years of service in the organization (*n* = 2966; 52.6%).

Data were collected as a part of a larger research on psychosocial risks, via electronic questionnaires sent by the management departments of each company which called on its voluntary participation. Participants filled the questionnaire online, through *SurveyMonkey*'s platform, during working hours and without any compensation associated. Individuals were assured of strict confidentiality. For this study there were only used part of the measures included in the questionnaire.

Measures

Job characteristics were measured using a Portuguese version (Carvalho & Chambel, 2013) of the Job Content Questionnaire (Karasek, et al., 1998). There were 7 items for job demands (e.g.: "I have too much to do"; α = .84) and 4 items for job control (e.g.: "I have the opportunity to decide how to organize my work; α = .85). Both measures were scored on a 5-point rating scale from 1 (*totally disagree*) to 5 (*totally agree*).

Well-being was measured with the assessment of work engagement, exhaustion and cynicism. Work engagement was measured with a Portuguese version of the Utrecht Work Engagement Scale (UWES-9) (Schaufeli, et al., 2006) that included 9 items (e.g.: "When I wake up in the morning, I feel good about going to work"; α = .94). Exhaustion was assessed

by a Portuguese version of a scale (Maslach Burnout Inventory) (Maslach, Jackson, & Leiter, 1997) that included 5 items (e.g.: "I feel emotionally drained by my work"; α = .91) and cynicism was assessed by the same instrument, with 5 items (e.g.: "I question the significance of my work"; α = .82). Respondents answered the items of this scales on a 7-point scale ranging from 1 (*never*) to 7 (*every day*). This scales have previously been used in Portuguese studies (Carvalho, & Chambel, 2017; Chambel, Castanheira, Oliveira-Cruz, & Lopes, 2015).

The correlations between the study variables are presented in Table 1.

Analysis

The statistical analysis consisted of two stages. In the first stage we conducted a LPA using the MPlus7, *Maximum Likehood Estimator*, to identify demands and control latent profiles (Muthén, L. K. & Muthén, B. O., 1998-2012) and test for H1. The optimal number of profiles was identified by performing two- to six-group solutions, starting by the model with two profiles and successively add one till the six-profile model. Each model was evaluated according to the following parameters: the Bayesian information criteria (BIC), Entropy values and the Lo-Mendell-Rubin adjusted likehood ratio test (LMR). The best possible profiles model should have the lower BIC, the highest Entropy, a significant LMR *p* value and enough people in each profile.

The second stage consisted on the analysis of the other proposed hypothesis (H2, H3 e H4). We used *BM Statistical Package for the Social Sciences* (SPSS 23.0) to conduct a one-way Analysis of Covariance (ANCOVA) followed by post hoc comparisons that used the profile group as the independent variable. Gender and length of service were controlled.

Results

Correlations between variables

Analysing the correlations among the studied variables (Table 1), job characteristics are significantly related with employees' well-being in a way that demands have a negative relationship with engagement and a positive relationship with exhaustion and cynicism. On the other hand, control has a positive relationship with engagement and a negative relationship with exhaustion and cynicism.

Table 1.
Means (M), Standard Deviations (SD) and Correlations (r) of the study variables.

			r					
	M	*SD*	1.	2.	3.	4.	5.	6.
1. Gender	0.61	0.49						
2. Length of Service	1.96	1.21	-.108**					
3. Demands	3.51	0.72	-.034*	.050**				
4. Control	3.20	0.88	-.024	.225**	-.092**			
5. Engagement	4.95	1.42	.0210	.192**	-.125**	.478**		
6. Exhaustion	3.50	1.60	.001	-.048**	.409**	-.271**	-.474**	
7. Cynicism	2.43	1.37	-.039**	-.115**	.234**	-.339**	-.541**	.622*

Note. * $p < .05$; ** $p < .01$

Demands and Control Profiles

LPA was used to identify latent profiles of job demands and control. We tested six profile solutions and compared BIC, Entropy, LMR values and number of people in each profile. However the six profile solution had a little bit higher BIC value and was still significant ($p < .001$) it presented one profile with only 15 people which is not representative considering the number of people in the sample. Therefore, the five profiles solution had the best fit (Table 2) presenting the highest entropy value, a significant LMR *p* value, and a considerable number of people in each profile.

Table 3 and Figure 1 show the results for the five profile solution. Participants in the first profile (*n* = 1086; 19%), which we called "Moderate-strain Profile" had medium-high levels of demands (3.61) and medium-low levels of control (2.19). The second profile (*n* = 321; 5%), had high levels of demands (3.82) and low levels of control (1.24), and thus, in line with Karasek (1979) we called it the "High-strain Profile". The third one, the "Moderate Active Profile" (*n* = 2374), comprising the major part of the sample (42%), was characterized by medium levels of demands (3.44) and medium-high levels of control (3.84). The fourth profile (*n* = 326; 6%), "Active Profile", was also called after Karasek's theory due to the fact that it had medium-high levels of demands (3.64) and high levels of control (4.73). Finally, the last profile (*n* = 1534; 28%) was labelled the "Moderate Profile" for having medium levels of demands (3.47) and control (3.05).

However it was proposed that a "Passive Profile" and a "Low-strain Profile" could emerge, these types of profiles weren't found. Therefore, H1 was only partially supported.

Table 2.
Fit indices for the six estimated solutions of job demands and job control profiles.

Profile's Number	BIC	Entropy	LMR *p* value	Latent subgroup proportions (%)
2	2,6658.19	0.694	*	76/24
3	2,6553.79	0.633	*	7/24/69
4	2,6521.34	0.719	*	23/4/8/65
5	2,6281.73	0.820	*	19/5/42/6/28
6	2,6286.98	0.836	*	28/5/6/0.27/19/42

Note. *$p < .001$; BIC: Bayesian information criterion; LMR: Lo–Mendell–Rubin test.

Table 3.
Mean values for job demands and job control in each identified profile.

Profiles	Job Demands *M*	Job Control *M*
1. Moderate-strain	3.61	2.19
2. High-strain	3.82	1.24
3. Moderate Active	3.44	3.84
4. Active	3.64	4.73
5. Moderate	3.47	3.05

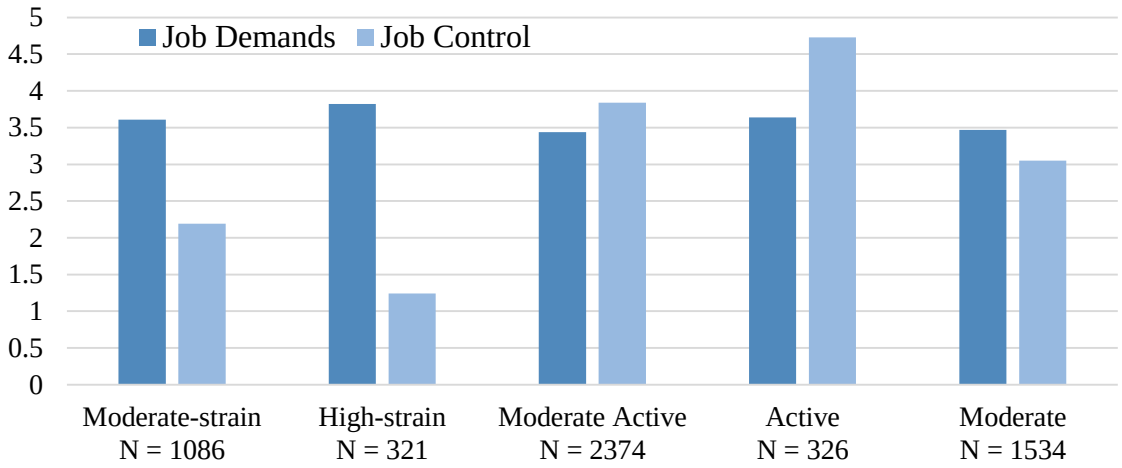

Figure 1. Profiles of job demands and control of the five profile solution.

Direct Strain Hypothesis

Table 4 shows the mean values of demands and control, and well-being variables (engagement, exhaustion and cynicism) in each profile. The High-strain profile (high demands and low control) reported the lowest engagement (3.03) and the highest exhaustion (4.83) and cynicism (3.96). The comparison of these variables between all the profiles was significant ($p < 0.001$; Table A1). Thus, these results are in line with Karasek's strain hypothesis and support H2.

Table 4.

Mean values of demands, control, engagement, exhaustion and cynicism for each of the five profiles.

Profiles	Demands *M*	Control *M*	Engagement *M*	Exhaustion *M*	Cynicism *M*
1. Moderate-strain	3.61	2.19	4.26	3.93	2.85
2. High-strain	3.82	1.24	3.03	4.83	3.96
3. Moderate Active	3.44	3.84	5.46	3.15	2.08
4. Active	3.64	4.73	5.85	3.16	2.00
5. Moderate	3.47	3.05	4.88	3.54	2.44

Buffer Hypothesis

In order to test if control buffers demands, we compared well-being scores of two profiles with similar levels of demands and different levels of control, namely the Active Profile (medium- high levels of demands and high levels of control) and the Moderate-strain Profile (medium-high levels of demands and medium-low levels of control). We can observe that in the Active Profile, where control is higher, well-being scores are better compared to the Moderate-strain Profile (Table 5). The comparison of these variables between these profiles was significant ($p < 0.001$; Table A1). According to this, H3 was also confirmed.

Table 5.

Mean values of demands, control and well-being in Moderate-strain and Active profiles.

Profiles	Demands M	Control M	Engagement M	Exhaustion M	Cynicism M
Moderate-strain	3.61	2.19	4.26	3.93	2.85
Active	3.64	4.73	5.85	3.16	2.00

Learning Hypothesis

The last hypothesis was proposed through a comparison of engagement levels between an Active Profile (high demands and control levels) and a Passive Profile (low demands and control levels). Even though the results did not show the existence of a Passive

profile, and thus H4 could not directly be analysed, the comparison between the Active Profile and the Moderate Profile[1] (medium demands and control levels) shows a difference between engagement levels (Table 6) ($p < 0.001$; Table A1). Thus, this result is in line with H4 and supports the assumption that control relates with motivation for learning.

Table 6.
Mean values of demands, control and well-being in Moderate and Active profiles.

Profiles	Demands M	Control M	Engagement M
Moderate	3.47	3.05	4.88
Active	3.64	4.73	5.85

Discussion

This study was set out to analyse the presence of demands and control profiles in a large Portuguese database in order to retest Karasek's strain and learning hypothesis, using a latent profile analysis.

The identified profiles were congruent with the previous literature concerning the expected balances between demands and control. However, contrary to what was proposed, we could not find any profile with low demands (neither a Passive Profile, with low demands and low control nor a Low-strain Profile, with low demands and high control). This might be due to the nature of the occupations in the sample. Nursing, banking, retail and contact centre jobs are known for generally being high-strain occupations (Giorgi et al., 2017), characterized by high workloads and a lot of time pressure. Although we initially argued that low demands' profiles could emerge due to subjective interpretations of the environment (Lazarus & Folkman, 1984) we could observe that it did not happen in enough people to

[1] The Moderate profile was considered for this comparison for having the lowest scores of both job demands and control between all the found profiles (Table 3).

identify a profile. This shows the importance of guaranteeing good organizational practices in these jobs as we can see that employees' perceptions strongly lean to feeling moderate-high demands.

Concerning Karasek's hypothesis testing, the direct strain hypothesis – high-strain jobs are characterized by high demands and low control - was supported and thus, these results go in line with the previous extensive findings on the matter (Fila, 2016).

We also found support for the buffer hypothesis – control buffer the relationship between demands and strain/well-being. This is extremely relevant as it indicates that, when designing interventions and thinking about employees' well-being at work, there is no need to decrease job demands if control over work is provided. In addition, we believe that more investigations using person-centred approaches will be useful to keep on founding support for this hypothesis.

The learning hypothesis – active jobs, characterized by high demands and high control, promote motivation - was also tested and although there was not a direct confirmation of this proposition, the results go in line with the assumption that environments with both high demands and high control over tasks are linked with better motivation levels. Therefore, it is important to challenge employees in order to keep them motivated to learn new skills and to professionally grow. However, as indicated by De Witte, Verhofstadt, and Omey (2007), more empirical studies using measures related to learning skills are still needed to significantly support this hypothesis, as we only tested for motivation to learn (i.e. engagement) and did not actually test if there was any actual learning.

Study Limitations and Future Research

This study presents a few noteworthy limitations. First of all, all data was collected through self-reported measures, thus it is possible that common method bias may have

affected the results. However, as we used scales and models that have already been used and tested for several times, we believe that the risk is smaller. Furthermore, when working with self-reported measures, and even if disclosure and confidentiality are secured, participants may respond according to social desirability.

Second, being a cross-sectional study, it does not allow to infer causal relationships but only their direction (positive or negative) and significance. Thus, we propose the replication of the study but with several measures of the variables, overtime (longitudinal design).

Third, as referred before, our sample was composed only by typically high-strain jobs, which did not allow the identification of any kind of profile with low demands, narrowing the possible comparisons between different profiles. As so, we propose that other kind of jobs should be included in next sample's studies. Namely jobs usually characterized by low demands, such as librarian, security guard, and so on. Moreover, all the occupations that were taken into account were "contactual professions" and thus, their work rely on other people to be accomplished which could impact how they perceive their demands and/or control (De Witte, Verhofstadt, & Omey, 2007).

Fourth, on the revised JDC model (JDCS Model – Karasek & Theorell, 1990), social support is included as another key job characteristic. We opted to not include this variable due to practical reasons as it would make the models even more complex to analyse. Even though, we believe that including this variable in the future would bring more interesting aspects to our study.

Fifth, and as said before, we did not have optimal outcome variables to test the learning hypothesis (e.g., a scale measuring skill's learning) but used engagement as criteria to describe motivational rather than learning-related phenomena.

Conclusions

To conclude, the present study provided support for the strain hypothesis (both direct and interactive) and for the learning hypothesis. Moreover, it calls for the importance of enhancing employees' job control as it can attenuate negative well-being outcomes provoked by demands and, even more, due to its influence on willingness to learn when in challenging environments.

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Footnotes

[1] The Moderate profile was considered for this comparison for having the lowest scores of both job demands and control between all the found profiles (Table 3).

Appendices

Appendix A.

Table A1.
Pairwise comparisons table.

Dependent Variable	(I) Profiles	(J) Profiles	Mean Difference (I-J)	Std. Error	Sig.
Engagement	Moderate-strain	High-strain	1.195*	.079	.000
		Moderate Active	-1.137*	.046	.000
		Active	-1.517*	.079	.000
		Moderate	-0.598*	.049	.000
	High-strain	Moderate-strain	-1.195*	.079	.000
		Moderate Active	-2.332*	.075	.000
		Active	-2.712*	.099	.000
		Moderate	-1.793*	.076	.000
	Moderate Active	Moderate-strain	1.137*	.046	.000
		High-strain	2.332*	.075	.000
		Active	-0.380*	.074	.000
		Moderate	0.539*	.041	.000
	Active	Moderate-strain	1.517*	.079	.000
		High-strain	2.712*	.099	.000
		Moderate Active	0.380*	.074	.000
		Moderate	0.919*	.076	.000
	Moderate	Moderate-strain	0.598*	.049	.000
		High-strain	1.793*	.076	.000
		Moderate Active	-0.539*	.041	.000
		Active	-0.919*	.076	.000
Exhaustion	Moderate-strain	High-strain	-0.903*	.098	.000
		Moderate Active	0.787*	.057	.000
		Active	0.787*	.098	.000
		Moderate	0.398*	.061	.000
	High-strain	Moderate-strain	0.903*	.098	.000
		Moderate Active	1.691*	.092	.000
		Active	1.691*	.122	.000
		Moderate	1.301*	.095	.000
	Moderate Active	Moderate-strain	-0.787*	.057	.000
		High-strain	-1.691*	.092	.000
		Active	1.297E-5	.091	1.000

		Moderate	-0.389*	.051	.000
	Active	Moderate-strain	-0.787*	.098	.000
		High-strain	-1.691*	.122	.000
		Moderate Active	-1.297E-5	.091	1.000
		Moderate	-0.389*	.094	.000
	Moderate	Moderate-strain	-0.398*	.061	.000
		High-strain	-1.301*	.095	.000
		Moderate Active	0.389*	.051	.000
		Active	0.389*	.094	.000
Cynicism	Moderate-strain	High-strain	-1.090*	.081	.000
		Moderate Active	0.742*	.048	.000
		Active	0.805*	.082	.000
		Moderate	0.397*	.051	.000
	High-strain	Moderate-strain	1.090*	.081	.000
		Moderate Active	1.832*	.077	.000
		Active	1.895*	.102	.000
		Moderate	1.487*	.079	.000
	Moderate Active	Moderate-strain	-0.742*	.048	.000
		High-strain	-1.832*	.077	.000
		Active	0.063	.076	.409
		Moderate	-0.346*	.042	.000
	Active	Moderate-strain	-0.805*	.082	.000
		High-strain	-1.895*	.102	.000
		Moderate Active	-0.063	.076	.409
		Moderate	-0.408*	.079	.000
	Moderate	Moderate-strain	-0.397*	.051	.000
		High-strain	-1.487*	.079	.000
		Moderate Active	0.346*	.042	.000
		Active	0.408*	.079	.000

Note: *. The mean difference is significant at the $p < .05$ level.